Sanjiv Ridge Stage 1 Short-range Endemic Invertebrate Fauna Risk Assessment

Report to Atlas Iron Pty Ltd

11 August 2025

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Executive Summary

Atlas Iron Pty Ltd (Atlas) is seeking to further develop the Sanjiv Ridge Project (the Project, formerly known as Corunna Downs Project), an iron ore project located in the Pilbara region of Western Australia, 33 km south of Marble Bar (Figure 1.1). The Mine Development Envelope (MDE) covers approximately 2,258 hectares (ha), and the Existing Approved Disturbance (EAD) for Stage 1 covers 423.11 ha of the MDE. New clearing is required to accommodate below water table mining and additional infrastructure, hereafter referred to as the Proposed Disturbance (PD), which represents an additional 196.79 ha of the MDE (Figure 1.1). Atlas recently commissioned Biologic Environmental (Biologic) to undertake a renewed desktop assessment for short-range endemic (SRE) invertebrate fauna for the MDE at Sanjiv Ridge (Biologic, in prep.).

Short-range endemic invertebrate fauna species records and habitat information were sourced from Atlas' internal terrestrial invertebrate database, Western Australian Museum (WAM) databases, and external reports of surveys within and nearby the MDE. These were presented in the renewed desktop assessment for the MDE. Identifications at the species level were aligned as much as practicable based on the information available for morphological and molecular identification within existing taxonomic frameworks. Following alignment of taxonomic identifications between WAM database searches and external reports, the remaining indeterminate records were examined against potentially similar species from the same site or the same sampling event.

Habitat assessments were undertaken at seven sites within the MDE during the Outback Ecology (2014) survey. Habitat mapping was also originally conducted during this survey. The habitat types used in the 2014 report differ from the standard Biologic terminology employed for the purposes of SRE surveys, and these were adjusted to Biologic standard terminology for habitat types. Widespread habitats included the generally low-lying landscape units with greater extent and connectivity throughout and beyond the MDE – Medium Drainage Line, Sandy Plain, Stony Plain and Undulating Low Hills. These habitat types were considered of Low suitability for SRE fauna. Any SRE taxa recorded from these landscape units are likely to be at low risk from the proposed disturbance.

Restricted and limited habitats include gorges and gullies in largely elevated landscape units that are isolated from other areas of similar habitat, and habitats that are limited within the landscape. The Gorge/ Gully habitat was considered limited and isolated in the landscape and of High significance for SRE invertebrate fauna. While Hillcrest/ Hillslope is usually a widespread habitat considered of Moderate SRE suitability in the Pilbara, it was considered limited and isolated in the landscape and of Low SRE suitability in the

environmental impact assessment (EIA). Drainage Area/ Floodplain habitats were considered limited in the MDE in the EIA but still well connected, and were considered of Moderate suitability for SRE invertebrate fauna. The restricted/limited habitat types once represented 838.50 ha (37.14%) of the MDE prior to approval and currently, excluding area under approved disturbance they represent 611.99 ha (33.36%) of the MDE. The PD will impact a further 196.79 ha of mainly Hillcrest/ Hillslope, Stony Plain and Undulating Low Hill habitats.

The risk assessment considered 14 taxa presented in the desktop assessment that were either Recorded, Highly Likely or Likely to occur within the MDE. A further three were indeterminate records and not considered in the assessment. All but two taxa considered in the assessment are morphospecies and have not undergone molecular analysis. All SRE taxa considered in this risk assessment were designated a risk rating of Low, as there is unlikely to be any impact to their current known distribution based on the proposed expansion of disturbance in the MDE.

Based on environmental approvals process at the time, SRE invertebrate fauna survey sample effort and diversity for Stage 1 of the Sanjiv Ridge (Corunna Downs) Project was deemed adequate to assess the impact of the current existing approved disturbance. Although there were no SRE invertebrate fauna sample sites within the proposed disturbance, the habitats represented have been deemed adequately assessed within the wider MDE and the expansion would remove a small additional proportion of habitat. The disturbance area within the MDE would be increased from 423.11 ha to 619.90 ha (27.46% combined EAD and PD), an increase of 8.72% in disturbance. Specifically, the proposed disturbance will remove 10.78% of the restricted and High SRE suitability habitat Gorge/ Gully within the MDE taking the cumulative total disturbance of this habitat type to 32.24%. However, all taxa considered in the risk assessment were designated a risk rating of Low due to taxonomic, distribution and habitat factors. None of these were collected within the PD as there were no sample sites within the PD. At the time of the approval for Stage 1, molecular taxonomy for these groups was at an early stage and most specimens still remain at either at a morphological level or indeterminate identification level. Based on the relatively small area of the proposed expansion, it is unlikely that any one of these taxa will be impacted by the removal of additional habitat.

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1 Introduction

1.1 Background

Atlas Iron Pty Ltd (Atlas) is seeking to further develop the Sanjiv Ridge Project (the Project, formerly known as Corunna Downs Project), an iron ore project located in the Pilbara region of Western Australia, 33 km south of Marble Bar (Figure 1.1). The Mine Development Envelope (MDE) covers approximately 2,258 hectares (ha) and the Existing Approved Disturbance (EAD) for Stage 1 covers 423.11 ha of the MDE. New clearing is required to accommodate Stage 5 below water table mining and additional infrastructure, hereafter referred to as the Proposed Disturbance (PD), which represents an additional 196.79 ha of the MDE (Figure 1.1). Atlas recently commissioned Biologic Environmental (Biologic) to undertake a renewed desktop assessment for short-range endemic (SRE) invertebrate fauna for the MDE at Sanjiv Ridge (Biologic, in prep.).

Atlas has requested that Biologic provide a risk assessment for SRE invertebrate fauna based on the renewed desktop assessment (Biologic, in prep.) in relation to the current MDE and PD.

This report provides:

1. A presentation of existing fauna habitat mapping and occurrence of SRE taxa in habitat types mapped throughout the MDE and the occurrence of SRE taxa in relation to proposed impact areas as indicated in the PD.
2. A Risk Assessment of SRE species values and habitat values in relation to potential impacts of the PD, as much as practicable within the constraints of available data.

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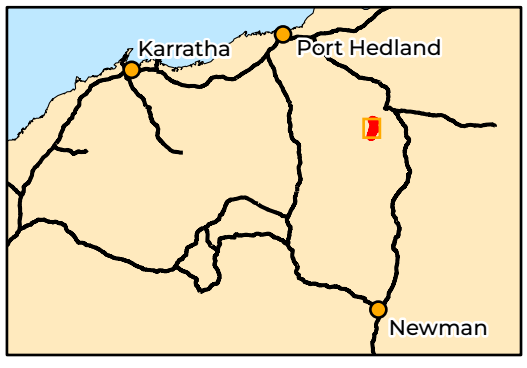
IBRA Region
Pilbara

IBRA Subregion
Chichester
Fortescue
Hamersley
Roebourne

Port Hedland
Karratha
Newman

LEGEND
Mine Development Envelope
Existing Approved Disturbance
Proposed Disturbance
Local Road

Scale 1:72,000
0 1 2 3 Km
Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator
Created: 15/07/2025



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Sanjiv Ridge Stage 1 Short-range Endemic Invertebrate Fauna Risk Assessment
Figure 1.1: Regional context of the Mine Development Envelope and Proposed Disturbance

2 SRE Survey in the Mine Development Envelope

2.1 Surveys in the Project Area

Two surveys have assessed SRE invertebrate habitat and fauna within and adjacent to the MDE (Table 2.1). The first of these surveys completed by Outback Ecology (2014) overlapped the southern half of the MDE and extended to the west. This survey was completed in 2014, during the wet season. The second of these surveys was completed by Biologic (Biologic, 2020) and assessed the Stage 2 Project Area. The study area for this survey overlapped only a very small area of the MDE and extended west, completed during a post-wet single season in May 2020. Only the latter survey was completed under the current legislation (EPA, 2016). The Outback Ecology (2014) survey only conducted molecular analysis on molluscs and spiders and Biologic (2020) on the *Karaops* spiders collected.

Table 2.1: SRE surveys within and adjacent to the MDE

Report Title	Survey Type	Sampling Dates	Effort	Location
Outback Ecology (2014) *Corunna Downs: Terrestrial SRE invertebrate fauna survey*	Single season (wet) detailed SRE invertebrate fauna survey	12 March-19 May (SRE survey), 24 Feb-7 March 2014 (vertebrate survey)	13 systematic SRE sites, 6 targeted SRE sites, 10 vertebrate pit-fall trapping by-catch sites	Within the southern half of the MDE and extending west
Biologic (2020) *Corunna Downs Stage 2 SRE invertebrate fauna report*	Single Season (wet) detailed SRE Invertebrate Fauna Survey	14-19 May 2020	30 SRE sites (12 sites sampled)	Small portion within mid-west of the MDE and extending west

An updated desktop assessment of SRE taxa within 40 km of the MDE was undertaken prior to this risk assessment. The full methods and results of these analyses were presented in the desktop assessment report (Biologic, in prep.). Short-range endemic invertebrate fauna taxon records and habitat information were sourced from Western Australian Museum (WAM) databases, Atlas of Living Australia (ALA), Dandjoo Biodiversity Data Repository and external reports of surveys within and nearby the MDE. The updated desktop assessment included minimum distances from the MDE and likelihood of occurrence analysis for each taxon.

Consolidation of the desktop assessment data for use in the risk assessment required alignment across databases. Identifications of taxa were aligned as much as practicable based on the information available for morphological and molecular identification within existing taxonomic frameworks. Preliminary linear ranges were calculated for all determinate taxa considered in the risk assessment based on collection records from nearby

surveys, WAM database records, and local and regional DNA databases, to the limit of available data. Following alignment of taxonomic identifications between WAM database searches and external reports, the remaining indeterminate records were examined against potentially similar species from the same site or the same sampling event. The approach aimed to:

- Provide a single, consolidated list of SRE invertebrate species (morphological and molecular) occurring in or highly likely to occur in the MDE and more specifically in the PD;
- Inform the assessment of habitat associations and species occurrence relative to proposed mining activity (PD) within the MDE; and
- Facilitate the assessment of species distributions in the wider local and regional area beyond the MDE.

2.2 Sampling effort

Three sites were actively sampled using SRE invertebrate fauna sampling methods within the MDE, none of which were within the PD (Table 2.2). The single systematic site employed SRE survey methods wet pitfall trapping, foraging, targeted searches, soil sieving and litter collection for use in Tullgren funnels. The two targeted sites utilised foraging and targeted search methods. An additional four sites within the MDE yielded by-catch of SRE specimens from vertebrate fauna dry pitfall trapping, none of which were located within the PD (Table 2.2, Figure 2.1).

All sites fall within the southern half of the MDE (Figure 2.1). All sites were sampled during the 2014 survey (Outback Ecology, 2014), which was not conducted under the current EPA (2016) guidance. This may be a limitation, as groups routinely collected as part of SRE surveys may not have been targeted under previous guidance. No molecular analysis was completed on the specimens collected from the MDE at the time, however sequencing was conducted on a small selection of spiders and snails for the subsequent environmental impact assessment (EIA) (MWH, 2016).

The main limitations to SRE survey within the MDE and PD include the absence of sites sampled within the PD and the northern half of the MDE, as well as the lack of molecular analysis on the specimens that were collected from the MDE. Molecular analysis is now considered routine when assessing SRE invertebrate fauna, as species are often cryptic and undescribed. Molecular analysis is currently the only way to gain an accurate understanding of the distribution of SRE taxa.

Table 2.2: SRE sampling sites within the MDE

Project	Site Type	Site ID	Latitude	Longitude	Habitat type	Sampling methods	Within DE (Yes/No)	Within PD (Yes/No)
Outback Ecology (2014)	Systematic	10	-21.4185	119.6817	Gorge/ Gully	Wet pitfall trapping, foraging, targeted searches, soil sieving, litter collection (Tullgren funnels)	Yes	No
Outback Ecology (2014)	Targeted	TAR3	-21.4521	119.6668	Gorge/ Gully	Foraging, targeted searches	Yes	No
Outback Ecology (2014)	Targeted	TAR5	-21.4736	119.6668	Gorge/ Gully	Foraging, targeted searches	Yes	No
Outback Ecology (2014)	Vertebrate pitfall trapping by-catch	C	-21.4192	119.6800	Hillcrest/ Hillslope	Dry pitfall trapping over seven nights	Yes	No
Outback Ecology (2014)	Vertebrate pitfall trapping by-catch	D	-21.4332	119.6739	Hillcrest/ Hillslope	Dry pitfall trapping over seven nights	Yes	No
Outback Ecology (2014)	Vertebrate pitfall trapping by-catch	H	-21.4579	119.6684	Hillcrest/ Hillslope	Dry pitfall trapping over seven nights	Yes	No
Outback Ecology (2014)	Vertebrate pitfall trapping by-catch	I	-21.4732	119.6687	Gorge/ Gully	Dry pitfall trapping over seven nights	Yes	No

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HABITAT

- Cleared/ Disturbed
- Drainage Area/ Floodplain
- Gorge/ Gully
- Hillcrest/ Hillslope
- Medium Drainage Line
- Sandy Plain
- Stony Plain
- Undulating Low Hills

Site Type

- SRE Survey Site outside DE
- Targeted SRE Search Site outside DE
- Vertebrate Systematic Sites outside DE

LEGEND

- Mine Development Envelope
- Existing Approved Disturbance
- Proposed Disturbance
- Local Road

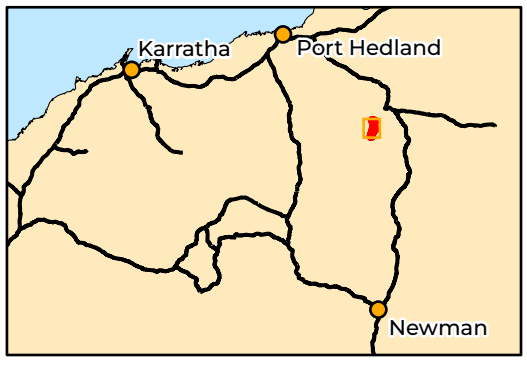
Site Type

- SRE Survey Site
- Targeted Search Site
- Vertebrate Systematic Site

Scale 1:72,000

0 1 2 3 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 15/07/2025



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Short-range Endemic Invertebrate Fauna Risk Assessment

Figure 2.1: Locations of SRE sampling sites within the DE

The desktop assessment identified just four SRE surveys within 40 km of the MDE (Biologic, in prep.). Two of these were over 25 km from the MDE. The lack of wider SRE survey in the region may also be considered a limitation if further molecular work was completed on specimens collected from the MDE, as there would be few sequences from which to compare.

2.3 Habitat types within the Mine Development Envelope

Habitat assessments were undertaken at seven sites within the MDE during the Outback Ecology (2014) survey. Habitat mapping was also originally conducted during this survey (Outback Ecology, 2014). The habitat types used in the 2014 report differ from the standard Biologic terminology employed for the purposes of SRE surveys, and these were adjusted as defined in Table 2.3 (and Figure 2.2). The habitat name adjustments and suitability of habitat for SRE fauna was taken directly from the desktop assessment (Biologic, in prep.), which was based on the EIA (MWH, 2016). Eight broad habitat types occur in the MDE (inclusive of Cleared/ Disturbed), of which all are also found in the PD.

Table 2.3: Habitat type grouping used in this risk assessment.

Habitat type – current report	Habitat types encapsulated within
Cleared/ Disturbed	Disturbance
Drainage Area/ Floodplain	Drainage Line
Gorge/ Gully	Rocky Ridge and Gorge
Hillcrest/ Hillslope	Ironstone Ridgetop
Medium Drainage Line	Riverine
Sandy Plain	Sandy Plain
Stony Plain	Calcrete, Spinifex Stony Plain
Undulating Low Hills	Stony Rise, Rocky Foothills, Granitic Uplands

2.3.1 Widespread habitat

Widespread habitat included the generally low-lying landscape units with greater extent and connectivity throughout and beyond the MDE. Undulating Low Hills, Stony Plain, Sandy Plain and Medium Drainage Line. These habitat types were considered of Low suitability for SRE fauna. Any SRE taxa recorded from these landscape units are likely to be at low risk from the proposed disturbance.

2.3.2 Restricted/Limited habitat

Restricted and limited habitats include gorges and gullies in largely elevated landscape units that are isolated from other areas of similar habitat, and habitats that are limited within the landscape. The Gorge/ Gully habitat was considered limited and isolated in the landscape and of High significance for SRE invertebrate fauna. While Hillcrest/ Hillslope is usually a

widespread habitat considered of Moderate SRE suitability in the Pilbara, it was considered limited and isolated in the landscape and of Low SRE suitability in the EIA (MWH, 2016). Drainage Area/ Floodplain (previously 'Drainage Line') habitats were considered limited in the MDE in the EIA but still well connected, and were considered of Moderate suitability for SRE invertebrate fauna (MWH, 2016).

2.3.3 Current approved disturbance vs proposed disturbance

Widespread and Cleared/ Disturbed habitats covered approximately 1,419.06 ha (62.86%) of the MDE prior to EPA approval. Based on the existing approved disturbance, they cover 1,222.46 ha (66.64%) of the remaining MDE. 'Restricted/Limited' habitats covered approximately 838.50 ha (37.14%) of the MDE prior to EPA approval and following existing approved disturbance, they cover 611.99 ha (33.36%) of the remaining MDE. The proposed disturbance (PD) will impact a further 196.79 ha, the majority of which is represented by Hillcrest/ Hillslope (79.26 ha), Stony Plain (39.86 ha) and Undulating Low Hills (35.78 ha) habitats (Table 2.4).

The restricted and High SRE suitability habitat Gorge/ Gully once represented 245.92 ha (10.89%) of the MDE prior to approval. The cumulative disturbance (proposed and existing) will impact a total of 79.27 ha which represents 32.24% of the total mapped Gorge/ Gully habitat (Table 2.4).

Table 2.4: Habitat removed in Existing Approved Disturbance (EAD), Proposed Disturbance (PD) and cumulative disturbance within the Mine Development Envelope (MDE). Restricted habitat types are indicated in light grey.

SRE habitats	MDE (ha)	MDE (%)	EAD (ha)	EAD (%)	PD (ha)	PD (%)	Cumulative disturbance (ha)	Cumulative disturbance (%)
Gorge/ Gully	245.92	10.89	52.77	21.46	26.50	10.78	79.27	32.24
Hillcrest/ Hillslope	537.00	23.79	169.85	31.63	79.26	14.76	249.11	46.39
Drainage Area/ Floodplain	55.58	2.46	3.88	6.99	0.95	1.71	4.84	8.71
Medium Drainage Line	37.73	1.67	1.36	3.60	0.48	1.27	1.84	4.86
Sandy Plain	157.05	6.96	18.60	11.84	7.60	4.84	26.19	16.68
Stony Plain	573.72	25.41	78.42	13.67	39.86	6.95	118.28	20.62
Undulating Low Hills	608.97	26.98	97.71	16.05	35.78	5.88	133.49	21.92
Cleared/Disturbed	41.59	1.84	0.52	1.25	6.36	15.30	6.88	16.55
Total	**2,257.56**		**423.11**		**196.79**		**619.9**	

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Marble Bar Rd

SRE Habitat

- Cleared/ Disturbed
- Drainage Area/ Floodplain
- Gorge/ Gully
- Hillcrest/ Hillslope
- Medium Drainage Line
- Sandy Plain
- Stony Plain
- Undulating Low Hills

LEGEND

- Mine Development Envelope
- Existing Approved Disturbance
- Proposed Disturbance
- Local Road

Scale 1:72,000

0 1 2 3 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 15/07/2025

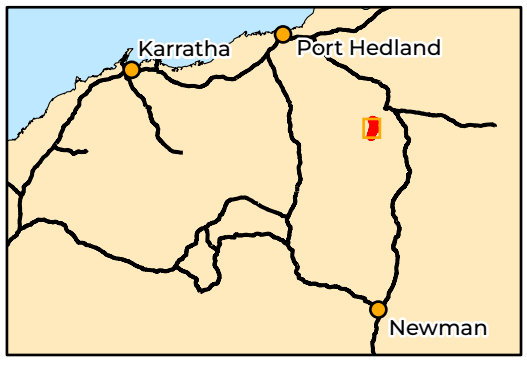

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Figure 2.2: Habitat mapping within the Mine Development Envelope (Outback Ecology 2014)

3 Risk Assessment

3.1 Limitations to the assessment of risk

Estimating what constitutes significant loss of habitat or populations of any particular SRE taxon in a certain area can be difficult to assess due to the lack of ecological understanding of each taxon under consideration. Many taxa have only been collected as a result of any imminent disturbance to their habitat due to mining activities and are often only found within a development envelope. Certainty of a specimen's identification is another key issue. Without certainty of taxonomic identification, estimation of a taxon's range can be flawed, either over- or underestimating its distribution in a landscape. At present, molecular sequencing is the only dependable method of identification unless numerous species are formally described in a particular genus and recent taxonomic keys are available. Another factor to consider is the degree to which significant habitats in region have been surveyed for SRE invertebrate fauna specifically. These factors in combination are the only measures that can give confidence to the estimation of risk to these animals in the absence of direct understanding of a species' distribution and habitat requirements.

3.2 Definition of risk level

We provide an estimated risk rating based on what we know of a particular taxon's range/distribution, the habitat type that it occurred in (whether widespread or restricted) and the amount of that habitat that will be removed by mining activities, specified here as the PD (Table 3.1).

Table 3.1: Definition of level of risk for SRE invertebrate fauna and habitats within the MDE

Category	Description
High	Taxonomic factors indicate that a species is **likely to be** restricted in range based on what is known of the genus or species, it has been collected from a **restricted** habitat type and a significant proportion of the known or likely habitat that it occurs in will be removed by mining activities (inside proposed disturbance).
Medium	Taxonomic factors indicate that a species is **possibly** restricted in range based on what is known of the genus or species, it has been collected from a **restricted** habitat type and a significant proportion of the known or likely habitat that it occurs in will be removed by mining activities (inside proposed disturbance).
Low	Taxonomic factors indicate that a species is **possibly** restricted in range based on what is known of the genus or species, it has been collected from a **widespread** habitat type.

3.3 Taxa considered in the risk assessment

The risk assessment considered 14 taxa presented in the desktop assessment that were Recorded, Highly Likely or Likely to occur within the MDE (Table 3.2, Figure 3.1). A further three were indeterminate records and not considered in the assessment. (see Appendix A for comments on indeterminate records). All but two taxa considered in the assessment are morphospecies or species complex' and have not undergone molecular analysis.

Three taxa are morphotypes of Armadillidae isopods originally assigned by Dr. Simon Judd. Current molecular work being undertaken on *Buddelundia* indicates morphospecies represent speculative designations and may rather indicate a higher grouping such as species complex (S. Judd pers, comm.). Consequently, these identifications could change with further molecular analysis on the specimens. Another two taxa are buthid scorpions in large species complexes, which have not been resolved taxonomically. Two further scorpions are morphotypes that also likely represent species complexes.

The remaining four pseudoscorpions and one philosciid isopod are morphological designations of specimens collected during previous surveys in the wider Project Area. These morphospecies were assigned by in-house taxonomists, and unfortunately the description for these are not publicly available. It is not possible, therefore, to identify any further specimens to these morphospecies without the aid of the original identifier, or molecular analysis.

One selenopid spider taxon and one snail have undergone molecular analysis. The selenopid *Karaops* sp. 2 did not match any sequences in the region and so retained its morphological names. The snail *Rhagada* MWH cf. Radleyi n.sp. matched two other sequences found up to 500 km away and was considered Likely Widespread. Both taxa were collected outside the MDE.

All SRE taxa considered in this risk assessment were designated a risk rating of Low, as there is unlikely to be any impact to their current known distribution based on the proposed expansion of disturbance in the MDE (Table 3.2, Figure 3.1).

Table 3.2: Potential SRE fauna Recorded or Highly Likely or Likely to occur in the MDE considered in this risk assessment

Order: Family	Taxon	Linear Range (km)	Likelihood of occurrence	Taxonomy resolution	Taxonomic factors affecting risk	Distribution and habitat factors affecting risk	**Risk**
Araneae: Selenopidae	*Karaops* `sp. 2`	~8	Recorded	Molecular	Most species belonging to this genus are considered SREs. Five specimens in this taxon were sequenced and matched each other.	These were all collected in restricted SRE habitat (Gorge/Gully or Hillcrest/ Hillslope), however they were found inside and outside the MDE. It is likely this taxon would be found throughout the central north-south ridgeline that extends beyond the MDE. Recorded in the Corunna Downs Stage 2 Study Area. Appears to be restricted to rocky habitats.	Low
Pseudoscorpiones: Olpiidae	*Beierolpium* '8/3'	Morphological designation uncertain	Highly Likely	Morphological	This morphological taxon has been identified in multiple areas of the Pilbara and is likely to be a species complex.	Collected from the surrounding region of the MDE	Low
Pseudoscorpiones: Olpiidae	*Indolpium* `sp. CRD01`	4.69	Highly Likely	Morphological	It is likely other representatives of these taxa will be identified with further survey and molecular analysis in the region.	Recorded in the Corunna Downs Stage 2 Study Area	Low
Pseudoscorpiones: Olpiidae	*Indolpium* `sp. CRD02`	single site	Highly Likely	Morphological	It is likely other representatives of these taxa will be identified with further survey and molecular analysis in the region.	Recorded in the Corunna Downs Stage 2 Study Area	Low
Pseudoscorpiones: Olpiidae	*Xenolpium* `sp. CRD01`	3.91	Highly Likely	Morphological	It is likely other representatives of these taxa will be identified with further survey and molecular analysis in the region.	Recorded in the Corunna Downs Stage 2 Study Area	Low
Scorpiones: Buthidae	*Lychas* `bituberculatus complex`	Morphological designation uncertain	Recorded	Morphological	*Lychas* taxonomy is in need of review. Molecular analysis seems to show some species with restricted ranges, however, most seem to become widespread species. This a morphotype of a species complex that may represent multiple species. *Lychas* may be found in a variety of habitat types.	Recorded within the MDE and the surrounding region	Low
Scorpiones: Buthidae	*Lychas `gracilimanus`*	Morphological designation uncertain	Likely	Morphological	*Lychas* taxonomy is in need of review. Molecular analysis seems to show some species with restricted ranges, however, most seem to become widespread species. This a morphotype of what is thought to be a species complex that may represent multiple species. *Lychas* may be found in a variety of habitat types	Recorded 2.35 km south-west of the MDE and in the surrounding region	Low
Scorpiones: Buthidae	*Lychas* `hairy tail complex`	Morphological designation uncertain	Recorded	Morphological	*Lychas* taxonomy is in need of review. Molecular analysis seems to show some species with restricted ranges, however, most seem to become widespread species. This a morphotype of a species complex that may represent multiple species. *Lychas* may be found in a variety of habitat types.	Recorded within the MDE and the surrounding region	Low

Order: Family	Taxon	Linear Range (km)	Likelihood of occurrence	Taxonomy resolution	Taxonomic factors affecting risk	Distribution and habitat factors affecting risk	**Risk**
Scorpiones: Urodacidae	*Urodacus* `Pilbara 16`	Morphological designation uncertain	Likely	Morphological	Urodacus taxonomy is in need of review. Molecular analysis seems to show most species with widespread ranges. This is a morphotype and inspection is needed by the original taxonomist to accurately identify additional specimens.	One record of this taxon has been recorded near a drainage line 2.33 km south-west of the MDE	Low
Mollusca: Camaenidae	*Rhagada* MWH cf. Radleyi n.sp.	single site	Likely	Molecular	Snails in this genus represent widespread and restricted species. This snail matched regional specimens up to 500 km away, however, species designation in *Rhagada* is uncertain, and it is considered likely Widespread.. It appears to be similar to a wider ranging species *Rhagada radleyi,* however, appearing different enough to be separated into a morphospecies of its own.	Collected from a gorge in an exclusion zone inside the MDE, as well as in the surrounding Pilbara region	Low
Isopoda: Armadillidae	*Buddelundia* `sp. 11`	Morphological designation uncertain	Recorded	Morphological	Buddelundia taxonomy is in need of review. Molecular analysis seems to show some species with restricted ranges.	Recorded within the MDE and the surrounding region	Low
Isopoda: Armadillidae	*Buddelundia* `sp. 86`	Morphological designation uncertain	Recorded	Morphological	Buddelundia taxonomy is in need of review. Molecular analysis seems to show some species with restricted ranges.	Recorded within the MDE and the surrounding region	Low
Isopoda: Armadillidae	Buddelundiinae `sp. mw`	Morphological designation uncertain	Highly Likely	Morphological	Armadillidae taxonomy is in need of review. Molecular analysis seems to show some species with restricted ranges.	Collected from within a small exclusion zone inside the MDE and in the surrounding region	Low
Isopoda: Philosciidae	Philosciidae `sp. corunna`	3.87	Highly Likely	Morphological	It is likely further representatives of these taxa will be identified with further survey and molecular analysis in the region.	Collected from within a small exclusion zone inside the MDE and approximately 2.6 km south of the MDE	Low

770000

780000

7640000

7630000

Taxon

- *Karaops* `sp. 2`
- *Beierolpium* `8/3`
- *Indolpium* `sp. CRD01`
- *Indolpium* `sp. CRD02`
- *Xenolpium* `sp. CRD01`
- *Lychas* `bituberculatus complex`
- *Lychas* `hairy tail complex`
- *Lychas* `gracilimanus`
- *Urodacus* `Pilbara 16`
- *Rhagada* MWH cf. Radleyi n.sp.
- *Buddelundia* `sp. 11`
- *Buddelundia* `sp. 86`
- *Buddelundiinae* `sp. mw`
- Philosciidae `sp. corunna`

LEGEND

- Mine Development Envelope
- Existing Approved Disturbance
- Proposed Disturbance
- Local Road

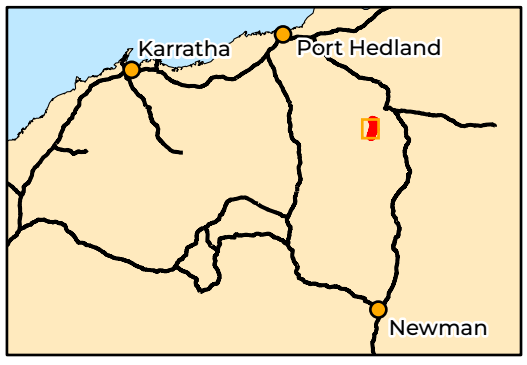
HABITAT

- Cleared/ Disturbed
- Drainage Area/ Floodplain
- Gorge/ Gully
- Hillcrest/ Hillslope
- Medium Drainage Line
- Sandy Plain
- Stony Plain
- Undulating Low Hills

Scale 1:72,000

0 1 2 3 Km

Coordinate System: GDA 1994 MGA Zone 50
Transverse Mercator Created: 15/07/2025



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Sanjiv Ridge Stage 1 Short-range Endemic Invertebrate Fauna Risk Assessment

Figure 3.1: Taxa 'Recorded', 'Highly Likely' and 'Likely' to occur within the DE

4 Conclusion

Based on environmental approvals process at the time, SRE invertebrate fauna survey sample effort and diversity for Stage 1 of the Sanjiv Ridge (Corunna Downs) Project was deemed adequate to assess the impact of the current existing approved disturbance. Although there were no SRE invertebrate fauna sample sites within the proposed disturbance, the habitats represented have been deemed adequately assessed within the wider MDE and the expansion would remove a small additional proportion of habitat. The disturbance area within the MDE would be increased from 423.11 ha to 619.90 ha (27.46% combined EAD and PD), an increase of 8.72% in disturbance. Specifically, the proposed disturbance will remove 10.78% of the restricted and High SRE suitability habitat Gorge/ Gully within the MDE taking the cumulative total disturbance to this habitat type to 32.24%. However, all taxa considered in the risk assessment were designated a risk rating of Low due to taxonomic, distribution and habitat factors. None of these were collected within the PD as there were no sample sites within the PD. At the time of the approval for Stage 1, molecular taxonomy for these groups was at an early stage and most specimens still remain at either at a morphological level or indeterminate identification level. Based on the relatively small area of the proposed expansion, it is unlikely that any one of these taxa will be impacted by the removal of additional habitat.

5 References

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MWH. (2016). *Corunna Downs Project: Terrestrial SRE Invertebrate Fauna Impact Assessment*. Unpublished report prepared for Atlas Iron Ltd. MWH Australia, Jolimont, WA.

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Appendix A: Indeterminate records of SRE fauna Recorded or Highly Likely to occur within the MDE considered in this risk assessment

Order: Family	Taxon	Likelihood of occurrence	Morphological/ Molecular Identification	Taxonomic and distribution and habitat factors affecting risk
Araneae: Anamidae	*Aname* `sp. indet.`	Highly Likely	Sequence attempted but failed due to pseudogene issue	Aname contains species that are widespread and restricted, however they are usually found in widespread habitats
Pseudoscorpiones: Olpiidae	*Indolpium* `sp. indet.`, *Xenolpium* `sp. indet.`	Recorded	Morphological	Taxonomic resolution of Olpiidae genera is uncertain in Australia, and recent molecular work shows varying success in supporting morphological genus designation within Olpiidae (excluding *Austrohorus*, which is an Australian genus). Given this, indeterminate Olpiidae identified in the area were treated collectively, disregarding genera designation. Olpiidae occur in a wide variety of habitats, widespread and restricted.